

Solid-State Lighting Manufacturing R&D Program Update



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James R. Brodrick, Ph.D.

U.S. Department of Energy

DOE Solid-State Lighting Program Mission and Goal

Mission

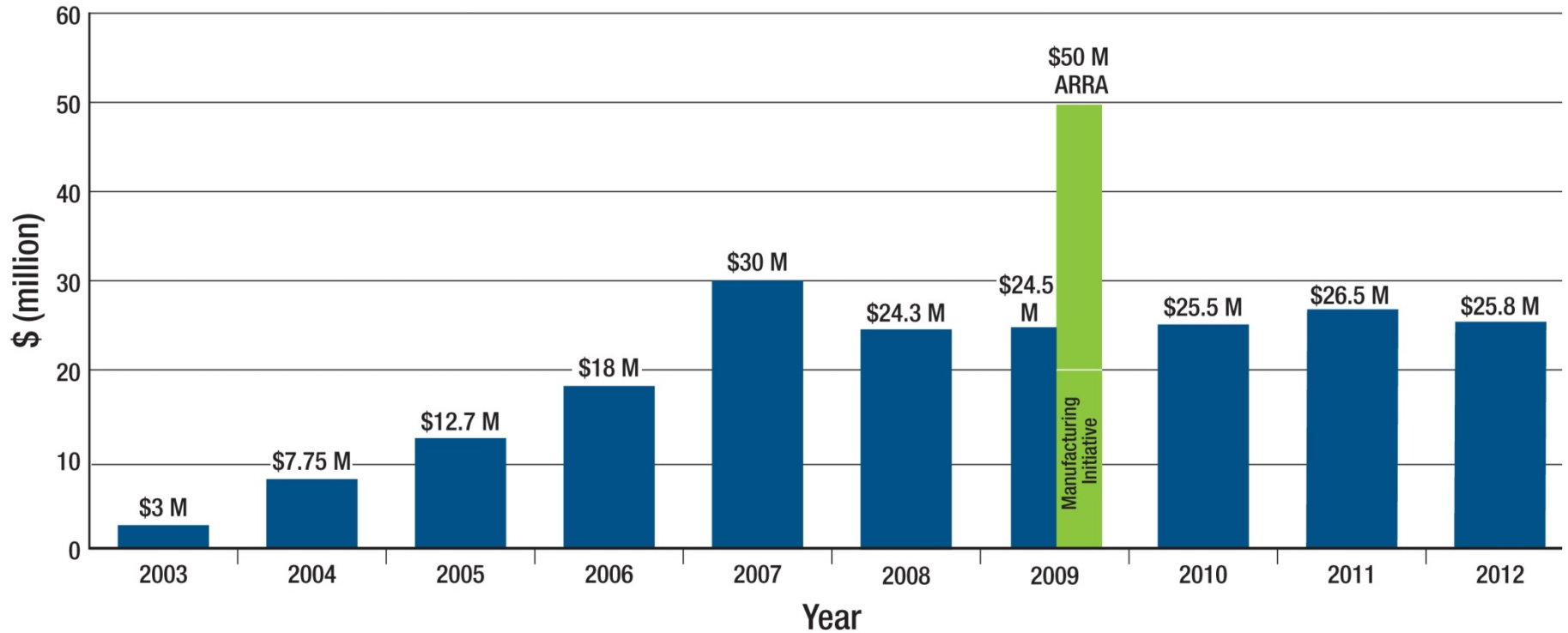
Guided by a government-industry partnership, DOE's mission is to create a new, U.S.-led market for high-efficiency, general illumination products through the advancement of semiconductor technologies, to save energy, reduce costs, and enhance the quality of the lighted environment.

Goal

By 2025, develop advanced SSL technologies that – compared to conventional lighting technologies – are much more energy efficient, longer lasting, and cost competitive, by targeting a product system efficiency of 50 percent with lighting that accurately reproduces sunlight spectrum.

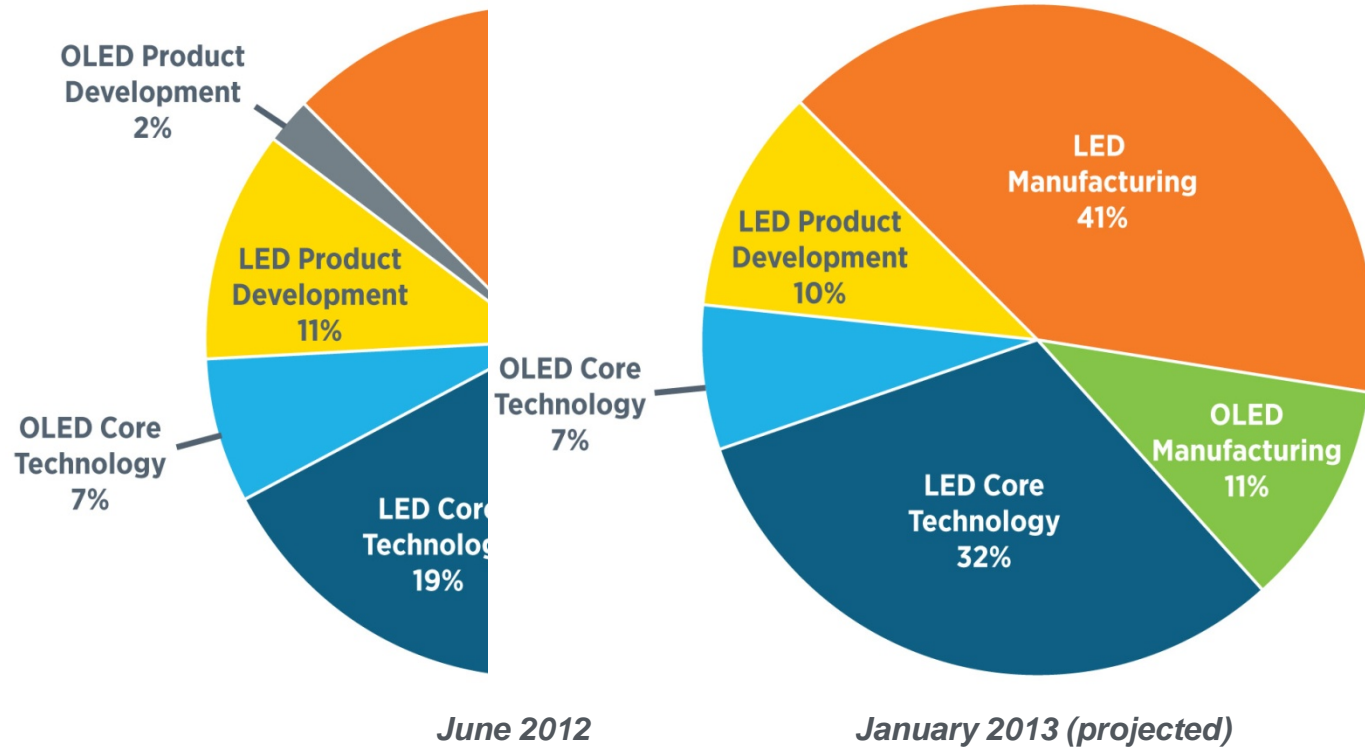


Congressional Appropriations

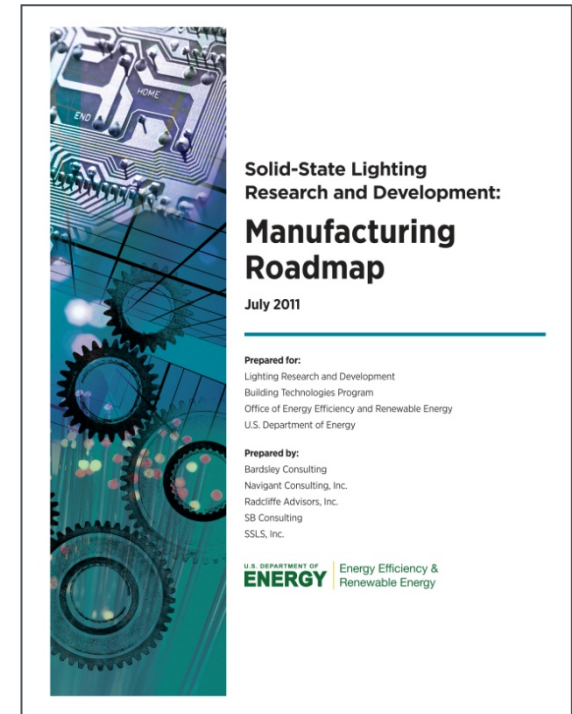


April 2012

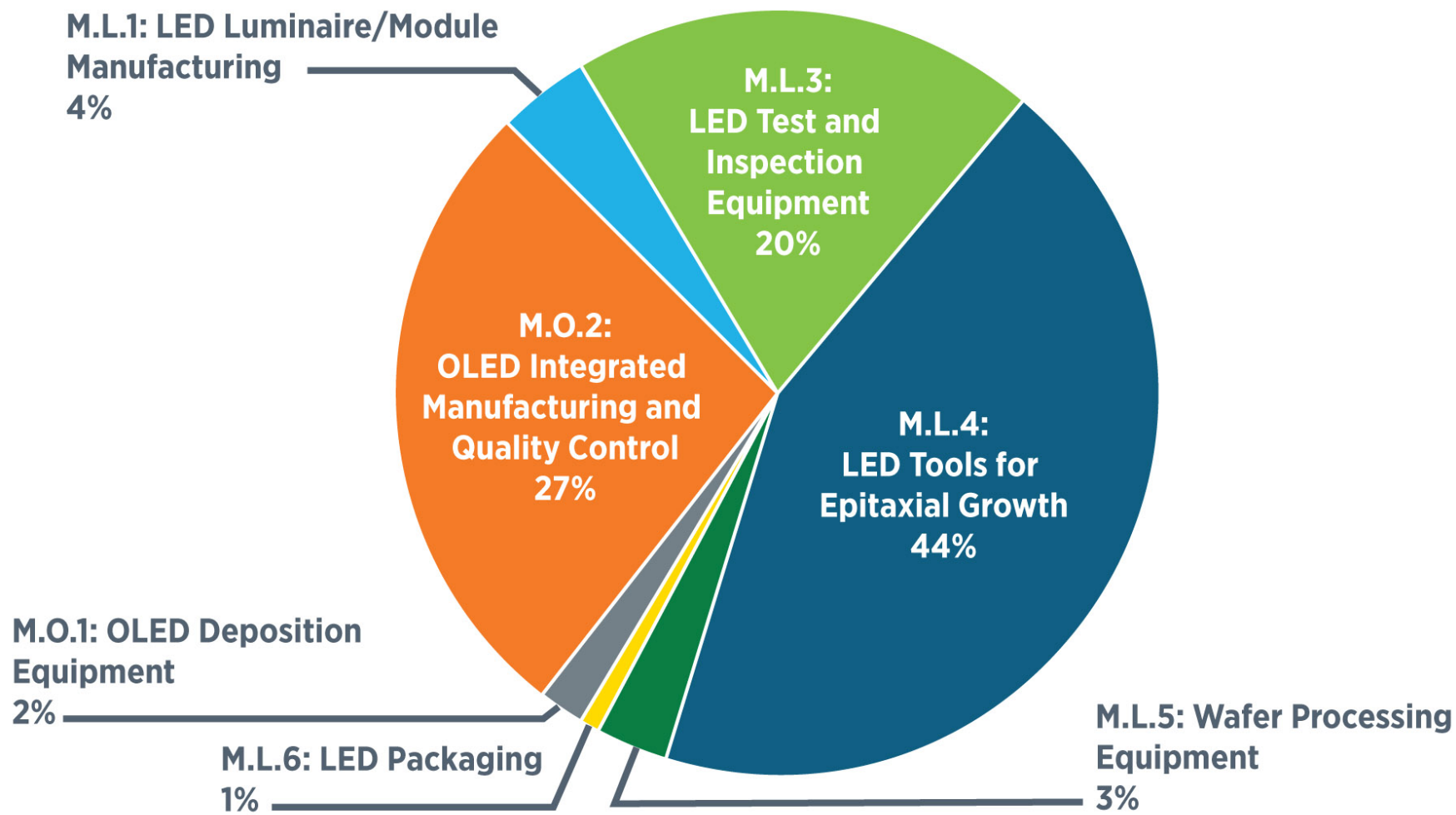
- Key changes in 2012:
 - Congressional direction for manufacturing
 - Round 1 manufacturing projects wrap up



- Key findings and recommendations for manufacturing improvements in three areas:
 - LED luminaires
 - Packaged LEDs
 - OLEDs
- Defines clear plans, timetables, and metrics to address roadblocks
- Guides equipment and materials suppliers, reduces risk
- Identifies best practices
- Informs DOE R&D solicitations



Historical View of All Manufacturing Projects



June 2012

Recipient	Project Title
M.L.1 – LED Luminaire/Module Manufacturing	
Cree, Inc.	Low-Cost LED Luminaire for General Illumination (NEW PROJECT)
M.L.3 – LED Test and Inspection Equipment	
KLA-Tencor Corporation	Automated Yield Management and Defect Source Analysis Inspection Tooling and Software for LED Manufacturing
	High Throughput, High Precision Hot Testing Tool for HBLED Wafer Level Testing (NEW PROJECT)
M.L.4 – LED Tools for Epitaxial Growth	
Applied Materials, Inc.	Advanced Epi Tools for Gallium Nitride LED Devices
Philips Lumileds Lighting Company	Low-Cost Illumination-Grade LEDs
Veeco Process Equipment	Implementation of Process-Simulation Tools and Temperature-Control Methods for High-Yield MOCVD Growth
Veeco Instruments	Development of Production PVD-AlN Buffer Layer System and Processes to Reduce Epitaxy Costs and Increase LED Efficiency

Recipient	Project Title
M.L.5 – Wafer Processing Equipment	
Ultratech Inc.	A Low-Cost Lithography Tool for High-Brightness LED Manufacturing
M.L.6 – LED Packaging	
GE Lighting Solutions	Development of Advanced Manufacturing Methods for Warm-White LEDs for General Lighting

Recipient	Project Title
M.O.1 – OLED Deposition Equipment	
K-space Associates	Optical Metrology for Volume OLED Manufacturing (NEW PROJECT)
M.O.2 – OLED Integrated Manufacturing and Quality Control	
GE Global Research	Roll-to-Roll Solution-Processable Small-Molecule OLEDs
Universal Display Corporation	Creation of a U.S. Phosphorescent OLED Lighting Panel Pilot Facility
Moser Baer Technologies	Process and Product Yield Improvements for Low-Cost Manufacturing of OLEDs

- Presentations to follow offer brief introductions to the projects, latest updates
- Poster session provides opportunity for more questions, one-on-one discussions



COMING TOGETHER
IS A BEGINNING;
KEEPING TOGETHER
IS PROGRESS;
WORKING
TOGETHER
IS SUCCESS.

~ HENRY FORD